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New primal-dual interior point methods for linear programming have been developed  
convergence properties have been determined.

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## Final Technical Report

"Integrated Approaches to Parallelism in Optimization and the Solution of  
Inverse Problems"

Grant # F49620-92-J-0203

Period Covered: 1 April 1992 - 30 September 1992

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### **Section 1**

#### **All Publications in Reviewed Journals**

- "An SQP Augmented Lagrangian BFGS Algorithm for Constrained Optimization"  
R.H. Byrd, R.A. Tapia and Y. Zhang  
SIAM Journal on Optimization  
May 1992, Vol. 2, No. 2, pp. 210-241.
- "On the Superlinear and Quadratic Convergence of Primal-Dual Interior-Point Linear Programming Algorithms"  
R.A. Tapia, Yin Zhang, and J.E. Dennis  
SIAM Journal on Optimization  
May 1992, Vol. 2, No. 2, pp. 304-324.
- "Superlinear and Quadratic Convergence of Primal-Dual Interior-Point Methods for Linear Programming Revisited"  
R.A. Tapia and Y. Zhang  
Journal of Optimization Theory and Applications  
May 1992, Vol. 73, No. 2, pp. 229-242.

Copies of each paper are enclosed.

### **Section 2**

#### **Books or Book Chapters Published**

- None.

### **Section 3**

#### **Graduate Students Supported**

- Natalia Alexandrov
- Marcela Rosembun

#### **Section 4**

#### **Postdoctoral Associates Supported**

- Virginia Torczon

#### **Section 5**

#### **External Honors Including**

#### **Society Awards, Fellows of Major Societies, and Invited Plenary Addresses**

#### **John E. Dennis, Jr.**

- invited to become an Advisory Editor, Mathematics of Operations Research.
- an Adjunct Professor of Combinatorics and Optimization, Waterloo University.
- Chair, SIAM Optimization Activity Group
- "Optimization with Differential Equations as Constraints," "Trust Region Methods for Nonlinear Programming," and "A Parallel Algorithm for Parameter Identification in Ordinary Differential Equations," Distinguished Lecturer Series; Clemson University; Clemson, South Carolina; April 1992.
- "Current Research in Numerical Optimization," Tercer Congreso Franco - Latinoamericano de Matemáticas Aplicadas y Primera Escuela, Chile - CEE de Optimización; Santiago, Chile; August 28, 1992 - September 6, 1992.
- "On Alternative Problem Formulations for Multidisciplinary Design Optimization," Fourth AIAA/USAF/NASA/OAI Symposium on Multidisciplinary Analysis and Optimization; Cleveland, Ohio; September 21-23, 1992.
- "Optimization with Simulation Constraints," invited address, National Institute of Standards and Technology; Gaithersburg, Maryland; September 28, 1992.

**Richard A. Tapia**

- Elected to the National Academy of Engineering, 1992.
- Listed in Who's Who in America, 1992.
- Member, SIAM Board of Trustees.
- Member, Joint Policy Board on Mathematics Rewards and Evaluation Committee, 1992.
- Member, Mathematical Sciences Educational Board, National Academy of Sciences, 1992.
- "Diversity and the Changing Role of Mathematics," keynote address in honor of Hispanic week, Sandia National Laboratories; Albuquerque, New Mexico; May 5, 1992.
- "Convergence of the Iteration Sequence in Primal-Dual Interior-Point Methods for Linear Programming," Fourth SIAM Conference on Optimization; Chicago, Illinois; May 11-13, 1992.
- "Our Hispanic Heritage and Science," address to the fourth and fifth grade class, West University Elementary; Houston, Texas; May 1992.
- "The Dynamics of Exclusion," invited speaker, Changing the Culture Workshop, Center of Research in Astrophysics; University of California; Berkeley, California; June 1992.
- High School for the Health Professions, Commencement speaker; Mercedes, Texas; June 1992.
- "Why Should I go to College?", address to graduating seniors, Milby High School; Houston, Texas; June 1992.
- Computational Sciences Awareness Workshop for K-12 Teachers, California Institute of Technology; June 1992.
- Computational Sciences Awareness Workshop for K-12 Teachers, SIAM National Meeting; Los Angeles, California; July 1992.
- Computational Sciences Awareness Workshop for K-12 Teachers, Sandia National Laboratories; Albuquerque, New Mexico; July 1992.

- "The Necessity of High Expectations for Minority Youth," In-service presentation, LaGrange Middle School faculty; LaGrange, Texas; August 1992.
- "Contemporary Educational and Diversity Issues," keynote speaker, Sandia National Laboratories Outreach Program for high school students and teachers; Livermore, California; September 1992.
- "What Universities Expect from Today's Student," In-service presentation, Milby High School faculty; Houston, Texas; September 1992.